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Pre-Hospital Practices



INTRODUCTION

In this module you will learn how to properly handle and manage patients involved in a radioactive material transportation incident.

PURPOSE

The purpose of this module is to increase your understanding of unique aspects of pre-hospital patient care during a radioactive material transportation incident. This knowledge will help you, as a responder, function with confidence during incidents that involve radioactive material.

MODULE OBJECTIVES

Upon completion of this module, you will be able to:

1. Identify protective measures for responder safety.
2. Demonstrate proper patient management based on acceptable medical practice.
3. Identify techniques for patient transfer to medical facility.
4. Demonstrate proper procedures for returning personnel, equipment, and vehicles to service.

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Protective Measures

Remember that certain personal protective clothing and equipment is appropriate for any medical response. In addition to providing protection from biological hazards, some of the standard equipment worn by EMS personnel will also provide protection from radiological contamination hazards.



Examples of appropriate Personnel Protective Equipment (PPE) include:

- Eye protection glasses with side shields or eye and mouth fluid mask combination
- N-95 airborne pathogen tuberculosis mask. *Note: this provides some protection against airborne radioactive material. For work inside the hot zone, or areas where higher levels of radioactive contamination are suspected, use of additional respiratory protection is suggested*
- Disposable gown (e.g., Tyvek®)
- Latex gloves *Note: wearing 2-3 pair will allow you to change gloves as needed. If gloves are changed while in the ambulance, place the potentially contaminated gloves in a bag for monitoring and disposal*

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- Shoe protectors

- Head cap

A complete bloodborne pathogen PPE kit, like the one listed above, will also afford some protection from airborne radioactive material to the EMS care provider.

PATIENT MANAGEMENT

Response to a radiation accident with injured persons involves on-scene assessment and Triage. Treat patient according to existing medical protocols. First, determine how many patients are present. If you have a single patient, you can afford more individualized care:

- Determine if the patient is ambulatory or non-ambulatory
- If non-ambulatory, determine if the patient has critical or non-critical injuries
- Decide whether you must perform a rapid extrication or if you have time to perform field decontamination before transport

If you have multiple patients, follow local mass casualty and medical treatment protocols:

- Utilize triage and a tagging system to prioritize the patients by medical injuries and conditions
- Maintain accountability for all patients
- Remove and care for the most critical patients first
- Determine whether to decontaminate patients prior to removal from the hot zone

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Patient Triage

When identifying patient priority during triage, follow local medical treatment protocols. The following generic protocols may be similar to your local definitions:

Immediate Transport—Life Threatening Injuries

- Unconscious or altered mental status
- Severe hemorrhage, unable to be controlled on-scene
- Respiratory arrest or distress
- Poor perfusion or associated signs and symptoms of shock
- Cardiac arrest in single patient, or with resources adequate to work the arrest
- Identify the mechanism of injury or the nature of illness

Delayed Transport—Non-Life Threatening Injuries

- Conscious, alert and oriented
- Minor wounds or controllable bleeding
- No respiratory distress beyond anxiety
- No significant mechanism of injury

Contamination Control

Determine if field decontamination of patients has been performed. For injured patients, treatment of injuries takes priority over radiological decontamination. The following information is intended for radioactive material contaminates only. If other hazardous material contaminates are present, follow your specific procedures for decontamination of those materials.

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Contamination Control—Life Threatening Injuries

If the patient has life-threatening injuries, field decontamination will most likely not have been performed prior to patient acceptance and transport. Therefore, consider the following:

- Initiate Advanced Life Support (ALS) care as appropriate
- Keep patient wrapped (cocoon-style) as much as possible
- Only expose areas to be assessed and treated
- As necessary for treatment, clothing should be cut away from patient
- Properly bag potentially contaminated clothing if removed
- Continue to assess and monitor vitals while en route to medical facility
- Contact with patient may result in transfer of contamination; change gloves and instruments as necessary
- Follow local Radiation Authority direction for contamination control and waste disposal

Contamination Control—Non-Life Threatening Injuries

If the patient has non life-threatening injuries, field decontamination should have been performed prior to patient acceptance and transport. Therefore, consider the following:

- Assess and treat injuries specific to patient complaint
- Patient's clothing should have been removed within the hot zone to reduce the spread of contamination
Note: if clothing was not removed prior to patient acceptance, keep patient wrapped cocoon style as much as possible. Only cut away clothing as necessary for patient treatment.
- Expose only those areas of the patient to be assessed
- Contact with patient may result in transfer of contamination; change gloves and instruments as necessary
- Follow local Radiation Authority direction for contamination control and waste disposal

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From a contamination control aspect, one can afford a more detailed decontamination effort for patients with non life-threatening injuries versus those patients with life- threatening injuries. Remember, as stated in the Emergency Response Guidebook, medical problems take priority over radiological concerns.

Decontamination Considerations

- Environmental exposure from decontamination may precipitate hypothermia and shock
- Keep the patients warm by covering them as soon as possible
- Be aware of additional hazardous material exposure
- Administer high flow oxygen via non re-breather mask
- Reassess the patient's condition frequently to include vitals
- Be cognizant that immobilized patients may have contaminants remaining posteriorly after wet or dry decontamination has been performed
- Follow local Radiation Authority direction for contamination control and waste disposal

Patient Considerations During use of Wet Decontamination

- The presence of additional hazardous material may warrant conventional hazmat decontamination
- Assess and treat patient for hypothermia
- Irrigate open wounds distally and laterally to the wound
- Properly contain the run off solution and clothing
- Remove the patient's shoes and socks to avoid contaminate retention
- Follow local Radiation Authority direction for contamination control and waste disposal

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PATIENT TREATMENT

Oxygen Administration

- Use a non re-breather mask (a non re-breather mask provides additional protection from inhalation hazards)
- Place mask on patient as soon as possible
- Medical provider should be wearing clean gloves during application
- Never withhold oxygen from a patient in need
- Follow medical protocols

ALS Invasive Airway Treatments

- Intubation should not be performed in the hot zone unless unable to secure airway by other means
- Transfer the patient to the cold zone utilizing the emergent move
- Take protective measures not to introduce inhalation hazards to the patient
 - Change to clean gloves prior to intubation
 - Maintain endotracheal tube sterility if possible
- Follow medical protocols including OPA, NPA, EOA, PTL, Combi-tube, LMA and EGTA

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Control of Bleeding

Take appropriate measures to control bleeding as necessary

- Control life-threatening hemorrhage immediately
- Cover wounds as quickly as possible to avoid internal contamination
- If irrigation is necessary, irrigate distally and laterally
- Avoid exposing covered wounds
- Follow medical protocols
- Contact with patient may result in transfer of contamination; change gloves and instruments as necessary

Circulation

Cardiac Arrest

- Initiate CPR if personnel and resources are available
- Treat patient in the cold zone
 - If the patient is in cardiac or respiratory arrest within the hot or warm zone, they should be moved immediately to the cold zone using the emergent move
 - The presence of radiation or contamination will not affect the operation of ALS equipment
- Avoid introducing internal hazards to the patient and the medical provider
- Utilize adjunct equipment such as bag-valve mask/demand valve
- Avoid mouth-to-mouth resuscitation
- Follow medical protocols
- Contact with patient may result in transfer of contamination; change gloves and instruments as necessary

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Spinal Immobilization

- If hazardous conditions permit and the medical situation indicates the need, a full spinal immobilization should be incorporated
- Only necessary equipment should be sent into the hot zone to minimize contamination of equipment
- Two blankets should be laid on the ground under the backboard with the bottom blanket left in the hot zone to minimize contamination spread
- Clothing should be cut away from the patient and removed during the patient log roll (Clothing should not be removed after full spinal immobilization has been applied)

Oral Medications

- Should not be administered in the hot zone
- Potassium iodide
 - Blocks the thyroid from uptake of radioactive iodine
 - Administer if approved by local, state, or tribal medical protocols
 - Administer as quickly as possible
 - Ensure patient is not allergic to potassium iodide
 - Ensure patient does not have thyroid enlargement
- Avoid introducing ingestion hazards to the patient
- Change gloves prior to administration of medication
- Survey the patient's face if appropriate and time permits
- Medication for additional medical conditions should be administered as local protocols direct

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ALS Invasive Procedures: Intravenous Cannulation

Intravenous cannulation should not be performed in the hot zone

- Transfer patient to the cold zone utilizing the emergent move
- Take protective measures not to introduce hazards intravenously
- Survey the selected IV site only if time permits
- Choose a non-injured extremity for the IV access
- Cleanse the selected site thoroughly using alcohol, or betadine and alcohol
- Follow medical protocols
- Change gloves prior to intravenous cannulation

PATIENT TRANSFER TO MEDICAL FACILITY

Ambulance Preparation

By taking a few steps prior to patient loading, EMS personnel can help minimize the spread of contamination inside the ambulance compartment during patient transfer. If time permits, consider the following:

- Avoid using internal and external compartments, work out of mobile medical kits as much as possible
- Close all internal compartments prior to loading patient
- Cover radio communication microphones with a rubber glove
- Cover floor of ambulance with disposable papers or pads

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Hospital Notification

Many hospitals have procedures in place for dealing with contaminated patients. Early notification is important to allow the hospital time to prepare to receive the patient. Consider the following when transporting contaminated patients:

- Give a brief but informative description of patient's condition
- Alert hospital of possible contamination and material involved
- Identify number of patients involved in the incident
- Transfer patient to the appropriate medical facility
 - Trauma Center
 - Facility capable of handling a contaminated patient
- Follow hospital instructions for unloading the patient. You will need to know:
 - Where to take the patient. Ask which entrance to use.
 - Who will be available to assist with the patient? It will be helpful to have radiation control and medical staff present.
 - When the facility will be ready to receive the patient. Wait in the ambulance until directed to unload the patient.
 - How the patient transfer will occur? Should you remain in the ambulance until transfer or go with the patient?
 - What the radiation control staff wants you to do with contaminated material from the patient and the ambulance.

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RETURN TO SERVICE CONSIDERATIONS

After a radiological incident, and when no longer needed to support emergency operations, take the following measures to return the ambulance and its personnel to service:

- Follow hospital and/or Radiation Authority direction upon arrival to the medical facility
- Follow hospital and/or Radiation Authority direction concerning dress down and contamination containment
- Make sure the ambulance is surveyed both internally and externally and released by the appropriate authorities
- Make sure you are surveyed and released by the appropriate authorities before returning to service
- The goal is to provide patient care according to medical protocols while minimizing the spread of contamination
- While waiting to be surveyed, do not eat, drink, smoke, or chew to avoid internal contamination
- As an additional precaution, consider taking a shower and changing clothes after being released by the Radiation Authority

Check Your Understanding



1. Some of the standard equipment worn by emergency medical personnel will provide protection from biological hazards as well as from radiological contamination hazards. True/False.

2. When identifying patient priority during triage, which of the following conditions would indicate the need for immediate transport?
 - a. Minor wounds or controllable bleeding
 - b. Presence of radioactive contamination on patient
 - c. Poor perfusion or associated signs and symptoms of shock
 - d. Patient is conscious, alert and oriented

3. Which of the following statements is true regarding decontamination?
 - a. Use of conventional wet decon is recommended for radioactive material
 - b. Avoid covering patient after decontamination
 - c. Delay treatment and transport of patient until decontamination is complete
 - d. Properly contain the run off solution and clothing

4. List 2 things that EMS personnel can do to help minimize the spread of contamination inside the ambulance compartment during patient transfer.

5. After a radiological incident and while waiting to be surveyed, ambulance crew members should not ____, ____, ____, or ____ to avoid internal contamination.

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ANSWERS

1. True
2. c
3. d
4. See page 10
5. eat
drink
smoke
chew